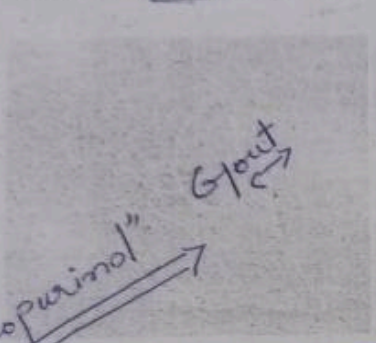
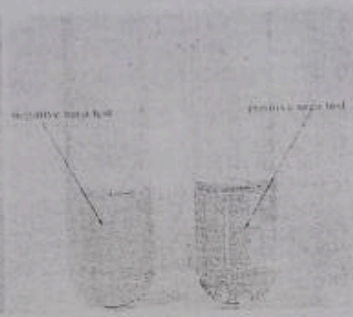
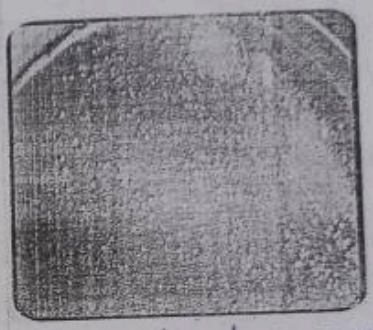
pg # 156. Micro biology.

Helicobacter pylori

A middle-aged man visits his physician, complaining of long-term stomach pain. Discomfort is at its peak after meals. A radioactive diagnostic test confirms the presence of and metabolism by the suspected bacterial pathogen and the following biochemical test was positive as shown in figure.







Stomach ulcer caused by Helicobacter pylori

1. What is the most likely etiology and infection?
2. What other diseases can be caused by *H.pylori*?
3. What is the mode of transmission?
4. What is the pathogenesis of the disease? ★
5. What is the cell morphology of the bacterium shown in figure 1 and the biochemical test shown in figure 2?
6. Given that it is Gram negative, what virulence factor allows it to survive in the hostile environment of the human stomach? Name the other virulence factors. Flagellum, Urease, Lipo-poly Sacharides, outer proteins
7. ★ What are the invasive and non-invasive tests used for the diagnosis of this organism? Urease Enzymes.
8. What is the classical presentation of this bacterium on Gram stain and Motility test?
9. What other staining techniques are used to stain these organism.
10. What is the medium used for culturing of this organism and the colony morphology?

(11) Name the other urease positive organisms.

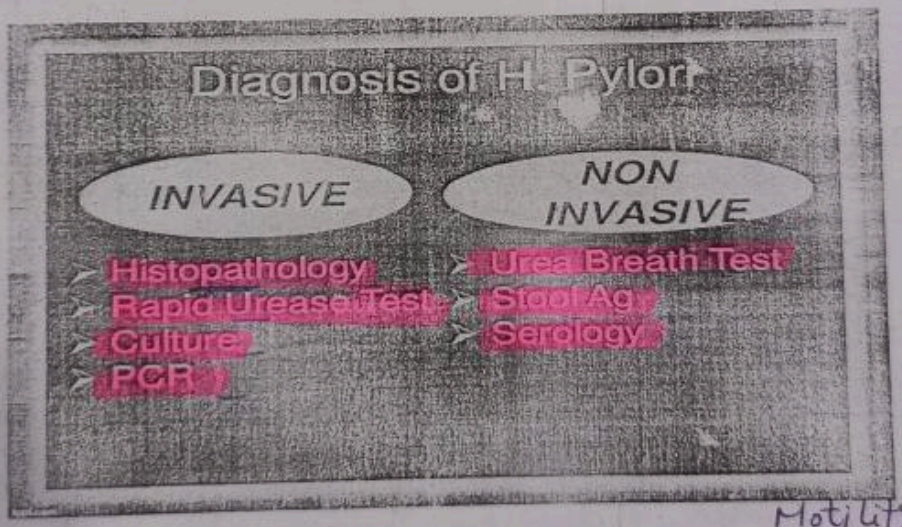
(12) What is Urea breadth test?

KEY:

Mam Sadia !

1. The patient most likely has a **stomach ulcer** caused by ***Helicobacter pylori***.
2. *Helicobacter pylori* causes gastritis & peptic ulcers, risk factor for gastric carcinoma, linked to mucosal-associated lymphoid tissue (MALT) lymphomas.
3. Acquired by ingestion (not been isolated from stool, food, water, or animals. Person-to-person transmission probably occurs, due to clustering of infection within families.
4. *H. pylori* attaches to the mucus-secreting cells of gastric mucosa. Production of large amounts of ammonia from urea by organism's urease, coupled with an inflammatory response, leads to damage to the mucosa. Loss of protective mucus coating predisposes to gastritis & peptic ulcer. Ammonia also neutralizes stomach acid, allowing organism to survive.
5. Curved rods (spirals) with multiple, polar flagella (**lophotrichous**), and the organism is urease positive.
6. The organism produces **urease**, an enzyme that converts urea to ammonia (which neutralizes stomach acid), thereby creating a suitable environment. **Virulence Factors**: Flagellum, Urease, Lipopolysaccharide, Outer proteins, Exotoxins, Enzymes.

Pathology for



Motility test.

8. Gull wing appearance on Gram staining & Darting motility on Motility test.
9. Warthin Starry stain & Steiner stain — Warthin starry stain, Steiner stain.
10. Skirrows medium

*:- urea breadth test:- In this test, radiolabel urea is ingested if the organisms is present. radiolabeled urea CO_2 evolved.
(1) urease will cleaves the ingested urea.
(2) radioactivity is detected in the breadth.

*:- urease +ve organisms:-

Proteus mirabilis
Proteus vulgaris.